A CASE OF SUPERFOETATION IN THE PIG

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1. INTRODUCTION

What would appear to be a case of superfoetation in the pig occurred recently in a herd belonging to Mr Henry Alexander, Bo'ness, Scotland. The history, verified by the writer after interviewing the owner, his employees, some neighbours, and also after personal examination of the animals concerned, is as follows.

A pure-bred Large Black sow aged 2 years and a few days gave birth on Wednesday, June 16th, 1926, to a litter of 4. Some 3 weeks after this her owner noticed that she was unusually well filled out for a sow which had recently given birth to a litter, but regarded this as evidence that she was a good milker. This suggestion, however, he did not confirm by examination. Exactly 31 days after the birth of this litter, on the morning of Saturday, July 17th, she gave birth to a further litter of 10. None of the pigs of either litter was in any way abnormal. Five of the second litter were, however, killed by the owner within 2 days of farrowing, for the reason that in his opinion the sow had not sufficient nourishment for them all.

The practice of mating sows employed by Mr Alexander was to let them run in a pen with a boar after weaning. In this case the Large Black sow ran with a Middle White boar for a period of approximately 3 months, by which time the owner said it was obvious that she was pregnant, and in the beginning of May he removed her to a sty by herself.

Unfortunately, the pigs were not weighed at birth, as the case was not reported until some time after. However, on August 4th, the first litter, which was then 48 days old and had been sold to a neighbour, averaged 19 pounds, while on the same day the second litter, now consisting of only 5 individuals, aged 17 days, averaged 9 pounds. On August 27th, the two litters, aged 72 and 41 days, weighed on an average 34 and 15 pounds respectively. The second litter did not do very well as the sow became short of milk. They were weaned at the age of 33 days. These weights are somewhat below the average usually obtained by similar cross-matings on this farm. All the pigs were of the type commonly associated with the Middle White × Large Black cross. There were no other litters on the farm of corresponding ages. The owner and his wife observed the sow in the actual process of farrowing on each occasion.

2. DISCUSSION

The sow is polyoestrous and this Large Black probably took the boar about 11 or 12 weeks after her previous parturition on December 3rd, when she had given birth to a litter of 9. Therefore the conception associated with the litter of 4 occurred in February. The sow was not removed from the boar till May.

According to Fleming (quoted by Marshall), the dioestrous cycle of the sow is from 2 to 4 weeks, though it is generally accepted as being around 20 days. It would appear that, in this case, the sow conceived to the first service but came in season again after a period of about 30 days which was somewhat longer than normal though by no means extraordinary, with the probable result that the conception associated with the litter of 10 occurred in March.

Cases of alleged superfoetation have been reported by Harman (1917, 1918) in the cat and in the cow; Hunt (1919) in the cat; Ingram-Johnson (1921) in the human; King (1913) in the rat; Kroon (1897) in the goat; Marshall (1922) in the cat; Sumner (1916) in the mouse; and Tapken (1890) in the sow. However, Kuntz (1920) has shown that in cases where a small foetus is delivered at the same time as a normal one, the probability is that it is due not to superfecundation or superfoetation but to intra-uterine death under circumstances in which, although extensive necrosis of the tissues occurs, very little absorption takes place, with the result that the external form of the foetus remains apparently well preserved and intact for a relatively longer period than usually intervenes between the death of such foetuses and the termination of pregnancy. Kuntz, dealing with three cases (two in the cat and one in the dog), which to the casual observer might have been attributed to superfoetation, shows clearly, by determining that all the foetuses present in the uterus were in the same phase of development during the early part of gestation, that they were instances of intra-uterine death and concludes that the great majority of reported cases of superfoetation may be interpreted in this way rather than on the assumption that one or more ova were fertilised and implanted in a uterus which was already pregnant with one or more foetuses in a more or less advanced stage of development.

All these cases, with the exception of the one in the sow, might be explained on the hypothesis put forward by Kuntz. The sow reported by Tapken was mated on February 22nd and again 17 days later. On June 17th, 120 days from the first mating, she gave birth to 7 live pigs and 14 days later to 9 live and 3 dead pigs. This is similar to the case under review but with a shorter interval and therefore not so definite.

It is equally impossible to explain by Kuntz's hypothesis the present case of the Large Black sow. In the first place, the two sets of foetuses were born with an interval amounting approximately to the dioestrous cycle. In the second place, neither the offspring of the first nor of the second parturition differed in

any way from the normal progeny of such a cross; they showed no signs of either under- or over-development, and it therefore must be concluded that the two litters were conceived at two different times, the difference being equal to the dioestrous cycle. While it is not uncommon for sows to come in heat again about 3 weeks after ovulation has occurred, it is extremely rare that ovulation accompanies such an oestrous period. The cervix of the sow is very slightly defined and there appears to be practically no uterine seal of pregnancy. Mr A. Walton, of Cambridge University, has informed the writer that after many observations with a full-grown boar on a medium or small-sized sow he had come to the conclusion that the penis does occasionally penetrate the cervix.

Whether each litter was located in a separate horn must remain a matter of conjecture. Warwick (1926) has, however, shown that in the sow internal migration of the fertilised ovum occurs and that some mechanism operates to produce a more or less equal distribution of the ova between the two horns; although it appears possible to get the ova congregating in one horn with a very few in the other. This, however, need not be regarded as essential. At the same time, it is worth noting that if such was the case, one would normally expect that the uterine contractions at the birth of the first litter would produce abortion of the second. If the two litters were located in different horns, then it appears from this case and that of Tapken that in the pig there is a considerable lack of co-ordination between uterine horns in various stages of pregnancy.

The cases here recorded can be explained by the assumption that the eggs from which the two litters originated were fertilised at different times. The eggs may have been liberated at the same ovulation. If this were so, then they could have been fertilised by spermatozoa introduced by separate coitions (superfecundation), or, on the other hand, a second ovulation followed by fertilisation may have taken place during pregnancy (superfoetation), and such ova may have been fertilised by sperms introduced at the first copulation which were still alive and functional during the subsequent ovulation, or else by spermatozoa introduced at a subsequent copulation during the course of pregnancy. If this were the case, then the eggs liberated by the second ovulation and subsequently fertilised, were located in one horn, or else the sperms were by some means able to pass the month-old embryos and fertilise the new ova, the resulting foetuses succeeding in remaining in place when the sow gave birth to the first 4. From the facts stated above, it would appear that either of these latter alternatives of superfoetation furnishes the explanation of this abnormal case.

3. SUMMARY

1. A Large Black sow gave birth to a litter of 4 and a month later to another litter of 10.

2. Previous reports of superfoetation in the human, cat, cow, rat, mouse, dog, goat, and pig are discussed.

3. It is shown that the hypothesis of Kuntz that these were not cases of superfoetation but of arrested embryonic development may hold good for all these cases with the exception of the one in the pig reported by Tapken and the case under review.

4. Attention is drawn to the fact that in the sow there may be a considerable lack of co-ordination between the uterine horns in various stages of pregnancy.

5. Whether this is a case of superfecundation or of superfoetation is discussed. The writer suggests that most probably it is a case of superfoetation since the period between the birth of the two litters is somewhat greater than the normal period of the dioestrous cycle.

4. ACKNOWLEDGEMENT

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